In the Claims

Please delete claims 20-29 and 32 without prejudice.

Please amend claims 8, 12, 16, 30, and 33, a cleaned-up version as Attachment A beginning at page i and a marked-up version of which is attached as Attachment B beginning at page vii.

REMARKS

In response to the Office Action mailed September 26, 2001 and the Advisory Action mailed January 22, 2002, the Examiner's comments and cited art have been studied. Claims 20-22, 24-27 and 29 have been rejected under 35 U.S.C. §102(b) as anticipated by McManus. Claims 1-4, 6, 7, 16-19, and 33-34 have been rejected under 35 U.S.C. §103(a) as being unpatentable over McManus in view of Narveson. Claims 8-13, 15 and 30-32 have been rejected under 35 U.S.C. §103(a) as being obvious over McManus alone. The remaining dependent claims have been rejected under 35 U.S.C. §103(a) as being obvious over McManus variously in view of Narveson, Minato and/or Sato. In light of the following comments, Applicants respectfully submit that the independent claims and the dependent claims are allowable. Prior to this Amendment, claims 1-33 were pending. Following this Amendment, claims 1-19, 30-31, and 33 are pending.

Specification Amendments

A substitute specification has been provided in numbered paragraph form. In addition, the specification has been amended to resolve certain typographical and grammatical errors discovered during Applicants' review of the application. No new matter was added.

Claim Amendments

Independent claims 8, 12 and 30 have been amended to more fully recite Applicants' disclosed subject matter. Specifically, as amended, these claims now recite a memory as part of the display device. An exemplary memory common in the industry comprises a 128 byte data capacity. Entry of these amendments was requested in the response to the final Office Action mailed September 26, 2001, but was rejected by the Advisory Action mailed January 22, 2002, as raising new issues that would require further consideration and/or search.

Claims 8, 16, 30, and 33 have been amended to make clear that the memory in the display device stores coefficients of the mathematical representation of the input-output transfer characteristics. These amendments merely make explicit what was already implicit in the claims and do not narrow the scope of the claims.

Claim 16 has also been amended to correct a typographical misspelling discovered during Applicants' review of the claims. The scope of the claim was not changed by the amendment.

Claims 20-29 and 32 have been cancelled without prejudice.

§ 103 Rejections Under McManus

Independent claims 1, 16 and 33 have been rejected under 35 U.S.C. §103(a) over McManus in view of Narveson. Independent claims 8, 12 and 30 have been rejected under 35 U.S.C. §103(a) over McManus alone. Independent claims 8, 12 and 30 have been amended to more fully claim a memory device in a display device. Claims 8 and 16 have been amended to clarify that coefficients of the mathematical representation are stored in the memory device in the display device. Applicants' comments regarding claims 1, 8, 12, 16, 30 and 33 are addressed together below.

The Combination of Elements From McManus and Narveson Does Not Suggest Storage of Coefficients in a Display Device

As recited by McManus, it is important to understand that McManus solves polynomial equations to determine and store in a lookup table brightness (intensity) values "for every single DAC value, and not just for the DAC value steps for which the intensity data was originally collected."[1] Thus, McManus recites a technique in which a brightness value can be determined directly from an input DAC value, without recomputation or solution of the polynomial equations used by McManus to originally generate the lookup table.

In contrast, Applicants' claimed subject matter does not recite the use of a lookup table created by solving the polynomial equations, but recites storing the coefficients for solving those equations. In other words, to determine a brightness corresponding to an input value, a device such as a computer connected to the display device would need to compute a brightness value or an input value using the polynomial equation, supplying the coefficients

from the display device's storage. McManus's technique fails to teach or suggest storing the coefficients in the display device; rather, McManus stores the results of solving the polynomial equations, while Applicants' claimed subject matter stores the values needed to solve Applicants' polynomial equations. One skilled in the art would not be motivated to store the coefficients in addition to the lookup tables of McManus, because once the lookup table has been created for every possible input value, as in McManus, there would be no need to use the coefficients for further computation.

The Office Action correctly recognizes that McManus fails to disclose storing the coefficients of the polynomial equations used for correlating the input voltage to the output brightness of the display device in the display device.[2] Further, the Office Action correctly recognizes that the computer stores lookup tables for correlating input voltages to brightness values.[3] However, the Office Action improperly attempts to fill this gap with Narveson.

The CRT of Narveson also stores a lookup table for correlating brightness values and input values. In contrast to McManus, which uses a lookup table that stores brightness values indexed by DAC values, Narveson uses a lookup table that stores a set of input voltage values, indexed by desired brightness values. Narveson does not recite the use of third-order polynomial equations, but uses a simple linear interpolation to interpolate between the brightness values and corresponding input values to determine an input value for a desired intermediate brightness value.[4]

In other words, Narveson also has no need to store coefficients, but recites storing the results of computations in the lookup table, similar to McManus, although inverting the lookup table to store input value instead of brightness values. Even though Narveson does not store a complete lookup table of all possible brightness value, and recognizes the need for performing a simple linear interpolation to compute intermediate values, Narveson fails to teach or suggest storing coefficients of that interpolation in the display device. Only Applicants' technique recognizes the benefit of storing such coefficients in a memory of the display device.

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[1] Col. 5, lines 17-20.
[2] Paper 10, para. 6.
[3] *Id.*
[4] Col. 5, lines 24-43.

Thus, even if McManus and Narveson are combined, they fail to teach or suggest Applicants' technique of storing coefficients of a mathematical representation in the display device.

The Inherency Argument Put Forward by the Office Action is Both Irrelevant and Improper

The Office Action appears to recognize that McManus and Narveson fail to teach storing coefficients in the display device and attempts to use an inherency argument to assert that "storing data that is used in computing is inherent to a computing process and in this sense it is understood that the coefficients are stored in some storage device, the polynomial function itself is represented in said look-up tables and they are stored by the computer according to McManus."[5] This argument is both irrelevant and improper.

First, whether the coefficients are stored in the computer connected to the display device is irrelevant, because Applicants do not recite such a technique. Applicants' claimed subject matter recites storing coefficients in the display device during manufacture of the display device. Storing coefficients in a computer on the assembly line would be of no use to a user of the display device, because they would be inaccessible, without the unworkable requirement to manufacture a computer for each display device and permanently tie the computer to the display device after manufacture.

In addition, such reliance upon a theory of inherency is improper. The standard for relying upon inherent disclosures is recited in the MPEP:

> "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original) In re Schreiber, 128 F.3d at 1478, 44 USPQ2d at 1432.
>
> ...
>
> **EXAMINER MUST PROVIDE RATIONALE OR EVIDENCE TENDING TO SHOW INHERENCY**
>
> The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d

[5] Paper 10, para. 6.

> 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); In re Oelrich, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " In re Robertson, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted)[6]

The Office Action's inherency argument fails because neither McManus nor Narveson store coefficients of a polynomial equation in the display device, as recited by Applicants' claimed subject matter. Instead of storing polynomial coefficients in the display device, both McManus and Narveson store lookup tables to allow direct lookup of brightness and input voltage values, respectively, without the need for such coefficients, as shown above. Narveson does not even <u>use</u> polynomial coefficients, because Narveson uses only a linear interpolation technique.[7] Thus, the Office Action's inherency argument fails, because the cited art provides counterexamples showing that Applicants' claimed subject matter is not necessarily present.

To establish a prima facie case of obviousness, certain basic criteria must be met.[8] One of those criteria is that the combination of the references must teach or suggest all of Appellants' claim limitations.[9] The Office Action simply fails to meet this criterion. In particular, as shown above, neither McManus nor Narveson, whether alone or in combination, teaches or suggests storing coefficients of equations used to define an input-output transfer function in a memory of the display device. Instead, both McManus and Narveson use a different approach that stores lookup tables, which eliminates the need for storing the coefficients that might have been used to generate the tables. The Office Action cannot use the different solutions achieved by McManus and Narveson as the specific teaching needed to show all of the limitations of Applicants' claimed subject matter.

For these reasons, Applicants respectfully request withdrawal of the rejections.

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[6] MPEP § 2112, p. 2100-51.
[7] Col. 5, lines 33-38.
[8] M.P.E.P. § 2143.
[9] *In re Royka*, 490 F.2d 981, 985, 180 U.S.P.Q. 580, 583 (C.C.P.A. 1974).

Neither McManus nor Narveson Teach or Suggest Storing Coefficient Data in the Color Display Device During Manufacture

McManus is directed to a post-manufacture calibration of a color display device. A "main computer 24" is connected to a monitor 20 to perform calibration of the monitor 20. McManus notes that, during manufacture, the electron guns of the monitor are over-biased, thus the calibration of the monitor, clearly done afterwards, should discard certain low DAC values.[10] Further, because McManus stores the lookup table in the computer 24, McManus could not usefully perform the generation and storage of the lookup tables during manufacture, without requiring the computer 24 and the monitor 20 stay together. Replacing the monitor 20 according to McManus's technique would render the lookup tables obsolete if they were stored during manufacture.

Narveson also fails to recite generating and storing coefficients during the manufacturing process. Although Narveson recites curve plotting may be automatic "on a production basis," this fails to teach or suggest generating and storing coefficients during manufacture. Further, as shown above, Narveson fails to teach or suggest storing coefficients at all, because Narveson does not use coefficients of equations. Thus, even if Narveson is seen as suggesting storing the lookup table in the CRT during manufacture, which Applicants do not admit, combining Narveson with McManus would fail to recite storing coefficients of equations during manufacture, because, as shown above, neither McManus nor Narveson teaches or suggests storing coefficients rather than the lookup tables recited by each of the cited references.

In contrast, Applicants' claimed subject matter expressly recites generating the coefficients "during a color display device manufacturing process." For these additional reasons, Applicants respectfully request withdrawal of the rejections.

Dependent Claims

With respect to claims 2-7, 9-11, 13-15, 17-19, 31, and 34, these claims depend from allowable claims 1, 8, 12, 16, 30, and 33, respectively, and are therefore also allowable. For this reason, Applicants respectfully request withdrawal of the rejections.

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[10] Col. 3, lines 1-10; Col. 4, lines 35-53.

CONCLUSION

The prior art made of record, but not specifically cited, is not believed to disclose any significant information that is not sufficiently discussed in this Response.

It is respectfully submitted that all issues and rejections have been adequately addressed and that all claims are allowable and that the case should be advanced to issuance.

If the Examiner has any questions or wishes to discuss the claims, the Examiner is encouraged to call the undersigned or David R. Clonts at the telephone number indicated below.

Respectfully submitted,

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ATTACHMENT B

Marked-Up Version Of Amended Claims (as of 3/7/02)

8. (TWICE AMENDED) A method of calculating a mathematical representation of the signal input-to-color brightness output relationship of a color display monitor during a display device manufacturing process, said method comprising the steps of:

providing input signals having predetermined incremental changes between said input signals to a color display device during the display device manufacturing process such that said color display device produces a predetermined pattern on the color display device's screen;

measuring a brightness of at least a portion of said predetermined pattern at each incremental change of said input signal and providing said measured brightness as brightness data to a general purpose computer;

correlating said input signals with said brightness data in said general purpose computer;

calculating coefficients of a mathematical representation, in said general purpose computer, of said correlated input signals to said brightness data;

storing during the display device manufacturing process said coefficients in a memory device [associated with] <u>in</u> said color display device.

12. (TWICE AMENDED) A color display device adapted to provide during a color display device manufacturing process a plurality of coefficients to a color display device driver circuit, said coefficients being related to a signal-input-to-brightness-output transfer function of said color display device, said color display device comprising:

input/output circuitry for connecting said color display device to a general purpose computer;

a display screen in communication with said input/output circuitry;

a data storage device[, associated with] <u>of</u> the display screen, for storing, at least, a plurality of coefficients for a signal-input-to-brightness-output transfer function, said plurality of coefficients being calculated after incremental signals are provided to said color display device, via said input/output circuit, such that a predetermined pattern is displayed on said display screen, a brightness data of said predetermined pattern is measured and correlated with each said incremental signal, a

transfer function, having coefficients, is calculated based on said correlation of said incremental signals and said brightness data, said coefficients then being stored in said data storage device, said coefficients being available to a color display device driver circuit when said color display device is connected to a general purpose computer.

16. (TWICE AMENDED) A computer system comprising:

a general purpose computer, said general purpose computer comprising a color display device driver;

a color display device connected to said general purpose computer, said color display device comprising a data storage device containing <u>coefficients for</u> a mathematical representation of an input-output transfer characteristic for the color display device stored during a color display device manufacturing process, said mathematical representation provided to said color display device driver in order to [aide]<u>aid</u> the standardization of a color brightness.

30. (TWICE AMENDED) A method of color management for a color display device, the method comprising the steps of:

generating during a color display device manufacturing process a mathematical model of a brightness transfer function describing a relationship between color input signals to a color display device and color brightness output of the color display device; and

storing a <u>coefficient</u> representation of the mathematical model in a memory device [associated with] <u>in</u> the color display device.

33. (TWICE AMENDED) A color management system for a color display device, comprising:

a means for generating during a color display device manufacturing process a mathematical model of a brightness transfer function describing a relationship between color input signals to a color display device and color brightness output of the color display device; and

a means for storing a <u>coefficient</u> representation of the mathematical model in the color display device.

ATTACHMENT D

Marked-Up Version Of Amended Specification Paragraphs (as of 3/7/02)

[0012] Referring to FIGURE 1, a CRT 10 is depicted. It is noted that this method can be used for substantially any display device. Such display devices include, but are not limited to, color display devices, VGA flat panel NCDs or SPVs, LCD, reflective LCD, and FED display devices [[INVENTORS: PLEASE PROVIDE ENGLISH FOR THE ACRONYMS)]. Regardless, of the type of color display device 0, a video signal (or its equivalent) is inputted into the color display device (CDD) 10 and a pattern is outputted on the CDD's screen. A grid or plurality of pixels 12 make up the displayed pattern. A pixel is a picture element or an addressable element within the displayed image on the CDD's screen.

[0014] Again, a pixel is essentially an element of a [CCD's]<u>CDD's</u> picture. A [CCD's]<u>CDD's</u> screen is substantially a grid of pixels to some extent. Focusing, for a moment on a single pixel 14 in an exemplary [CCD]<u>CDD</u> 10, it is desirable to determine an accurate transfer function that describes the relationship between a voltage input to the [CCD]<u>CDD</u> 10 and a resulting brightness of the pixel 14.

[0015] The present exemplary method of representing the brightness output of a [CCD]<u>CDD</u> pixel 14 at any given voltage level input, via a signal generator 16, is provided as a polynomial expression. A polynomial expression is chosen because it can provide a more accurate transfer function than the prior art gamma function technique.

[0022] Once the equation is solved for the coefficients a_3, a_2, a_1 and a_0, then a sufficiently accurate transfer function is established which can predict a brightness B for any input voltage V applied to the [CCD]<u>CDD</u> 10. The brightness has been empirically determined to be accurate to within approximately ± 0.3 foot-lamberts if a third order polynomial is utilized.

[0023] The above method can be repeated for each color red, blue and green thereby providing four coefficients a_3, a_2, a_1 and a_0 for each color, totaling 12 coefficients in all. That is, four coefficients for red, four for green, and four for blue. Theoretically, one could average or compress each set of four numbers and only have three numbers (one number for each red, green and [blue) .]<u>blue).</u> Also one could average all the a_0s to produce a single A_0 for red, [yellow]<u>green,</u> and blue. Then similarly average all the a_1s and a_2s and a_3s to produce only

four coefficient numbers for each transfer function. The a_0 coefficient could be dropped and not used when it is an insignificant number. It is understood that any compressing, averaging or deletion of the resulting coefficient numbers will generally decrease the accuracy of the transfer function over the full range V_{min} to V_{max}.

[0026] This is an important advancement in color display technology particularly in the area of advertising on the internet. A manufacturer may produce a web site to sell products, for example, clothing, wall paper, [title]tile, paint, fabric, pictures, or other manufactured items. The color of the products may be very important to the buyer. Thus, it would be advantageous to the seller and buyer to know that the color represented on the computer screen is substantially and accurately the same color as to actual product.

[0031] The control system 206 controls the signal generator to provide incremental voltage or video color (V) steps ranging from a V_{min} to a V_{max} for one of the output colors (red, green or [blue) .]blue). The signal generator 204 provides a pattern and voltage level for the color to the monitor 200 via the VGA connector 202. The resulting pattern 212 displayed on the monitor screen 210 could be a red dot or square comprising a plurality of pixel locations. As the voltage input controlling the pattern is incrementally changed from V_{min} to V_{max} or [visa=vis]vice versa, the brightness of the resulting pattern 212 is measured incrementally by the photometer 208. It is understood that the pattern 212 need only be a pattern large enough to be discerned and focused on by the photometer. The patterns shape is not substantially significant. Furthermore, the pattern could be positioned at one or various locations on the screen 210.